Acura Embedded Systems Inc.

Industrial Computing Solutions

Fan-less Computer

PowerBrick AQ6

User Manual

Acura Embedded Systems Inc.
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Chapter 1: Product Introduction

Overview

Key Features

- Onboard Intel® Atom™ processor E3845 Quad Core,1.92 GHz.
- Dual Independent Display from DVI-I and HDMI
- 2x Intel® I120IT LAN ports support WoL, Teaming and PXE
- 2x USB2.0 & 1 x USB3.0
- 4xCOM ports (COM1 & COM2 with RS232/422/485)
- 1x Optional Interface for optional Wi-Fi/3.5G/Automation modules
- External RTC battery holder for easy replacement
- Support -20 ~ 70 degree C extended operating temperature
- Support 9-30VDC input

Hardware Specifications

CPU Support

- Onboard Intel® Atom™ processor E3845 Quad Core,1.92 GHz

Main Memory

- 1x DDR3L SO-DIMM Socket, Support DDR3L 1066/1333 4GB RAM (Optional upgrade to 8GB) , un-buffered and non-ECC ,

Display Option

- Dual Independent Display
  - HDMI and DVI-D
  - HDMI and VGA (via DVI-I to VGA converter)

I/O Interface - Front

- ATX power on/off switch
- 1x Power Status/1x HDD Access/1x Battery Low/1x Programing LEDs
- 1x External CFast socket
- 1x SIM Card holder
- 2x Intel® I210IT GbE LAN Ports, support Wake on LAN, Teaming and PXE
- 1x DVI-I Display Output
- 1x USB3.0 (900mA per each)
- 1x USB2.0 (500mA per each)
- 2x DB9 for COM1 & COM2, both support RS232/422/485 with auto flow control
- 1x Remote Power ON/OFF Switch
- 1x 2-pin DC input, support +9 to 30VDC input

I/O Interface - Rear

- 1x USB2.0
- 1x HDMI
- 1x RTC Battery
- 2x DB9 for COM3 & COM4
- 1x Mic-in & 1 x Line-out
- 2x Antenna Holes for optional Wi-Fi/3.5G antenna
- 1x Optional I/F for optional mini-PCIe Wi-Fi/3.5G/Hilscher Automation module output

I/O Interface - Internal

▪4x GPI and 4 GPO (5V, TTL Type)

Storage Device

- 1x CFast (SATA2.0)
- 1x 2.5" SSD (SATA2.0)

Expansion Slot

▪1x Mini-PCIe socket for optional Wi-Fi/3.5G/Hilscher automation modules

Power Requirements

▪Power input: +9VDC to 30VDC, 6.6A to 2A

Support OS

- Windows 8
- Windows Embedded Standard 8
- Windows 7
- Windows Embedded Standard 7
- Windows Embedded Compact 7
- Linux Kernel version 3.8.0

Dimensions

▪185mm (W) x 131mm (D) x 54mm (H) without wall-mount bracket

Construction

▪Aluminum and Metal Chassis with fanless design)

Environment

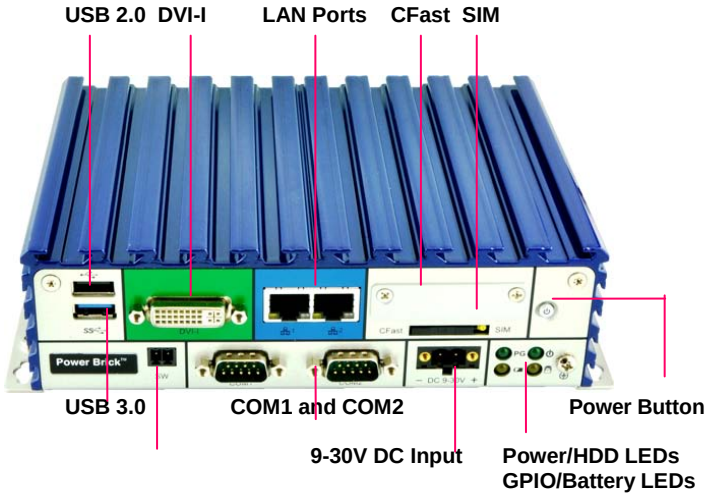
- Operating Temperature:
  Ambient with air flow: -20°C to 70°C with industrial grade device
  (According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage Temperature: -30°C to 85°C
- Relative Humidity: 10% to 95% (non-Condensing)
- Shock Protection:
  HDD: 20G, half sine, 11ms, IEC60068-27
  CFast: 50G, half sine, 11ms, IEC60068-27
- Vibration Protection w/HDD Condition:
  Random: 0.5Grms @ 5~500 Hz, IEC60068-2-64
  Sinusoidal: 0.5Grms @ 5~500 Hz, IEC60068-2-6
- Vibration Protection w/CFast & SSD Condition:
  Random: 2Grms @ 5~500 Hz, IEC60068-2-64
  Sinusoidal: 2Grms @ 5~500 Hz, IEC60068-2-6

Certifications

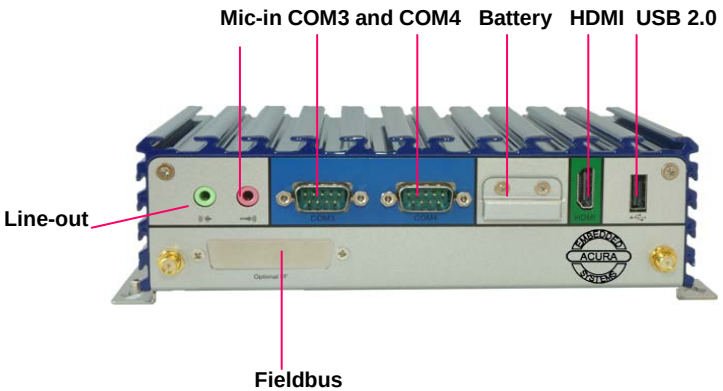
- CE
- FCC Class A
- UL/cUL

Knowing PowerBrick AQ6

Front Panel



Rear Panel



USB 2.0
USB 2.0 port to connect the system with USB 2.0/1.1 devices.

USB 3.0
USB 3.0 port to connect the system with USB 3.0/2.0 devices.

DVI-I
Used to connect a digital LCD panel.

Remote On/Off Switch
Used to connect a remote to power on/off the system.

LAN Ports
Two LAN ports used to connect the system to a local area network.

COM1 and COM2
Two DB9 ports used to connect RS232/422/485 compatible devices.

CFast Slot
Used to insert a CFast card.

SIM Slot
Used to insert a SIM card.

9-30V DC Input
Used to plug a DC power cord.

Power/HDD LEDs
Indicates the power status and HDD activity of the system.

GPIO/Battery LEDs
Indicates the status of the battery and GPIO.

Power Button
Press to power-on or power-off the system.

Line-out
Used to connect a headphone or a speaker.

Mic-in
Used to connect an external microphone.

COM3 and COM4
Two DB9 ports used to connect RS232/422/485 compatible devices.

Battery Slot
Used to hold an external battery.

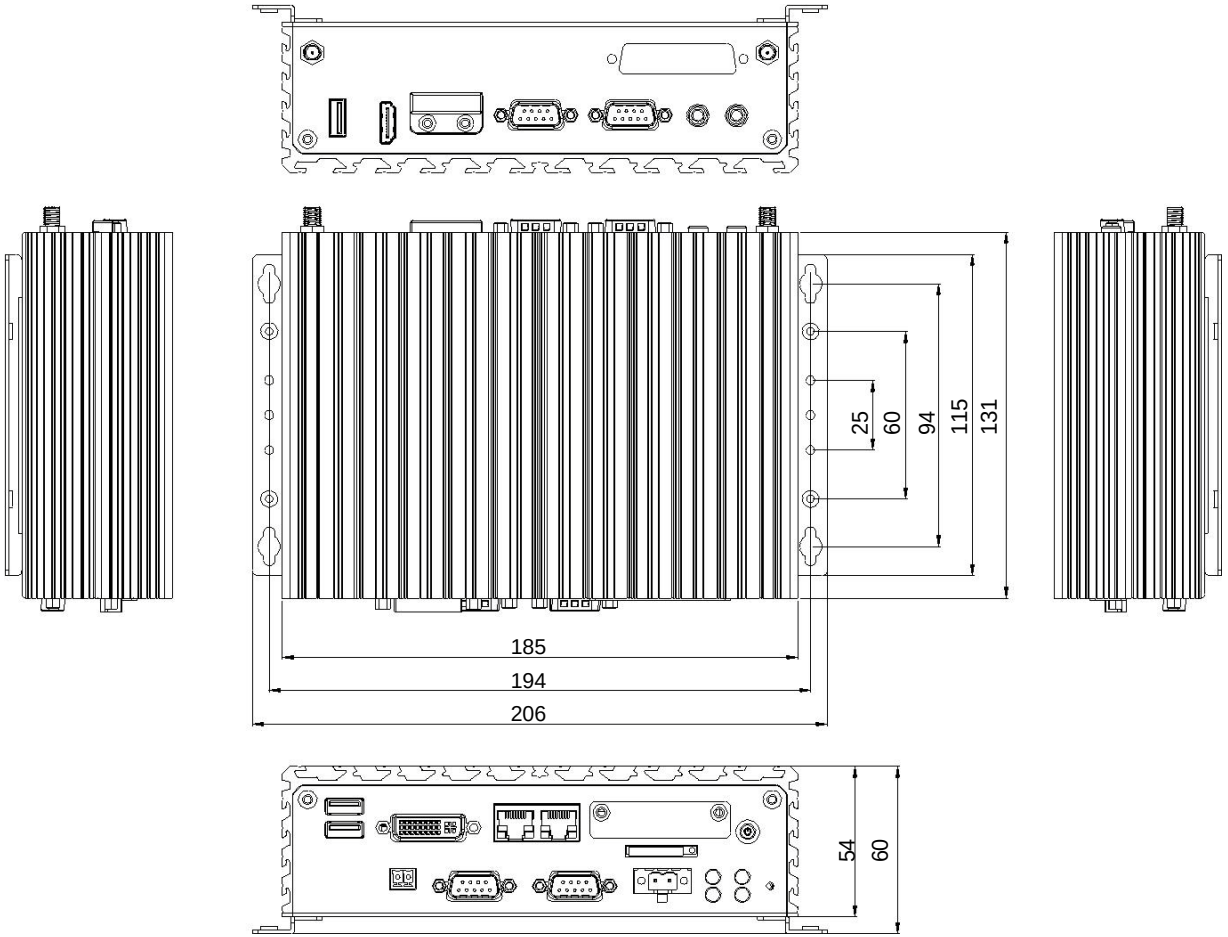
HDMI
Used to connect a high-definition display.

USB 2.0
USB 2.0 port to connect the system with USB 2.0/1.1 devices.

Fieldbus

Expansion slot for add-on fieldbus modules.

Mechanical Dimensions



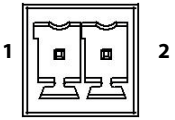
Chapter 2: Connectors

Connector Pin Definitions

External I/O Interfaces - Front Panel

Remote Power On/Off Switch

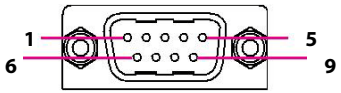
Connector type: 2-pin switch



Pin	Definition
1	PBT_PU
2	GND

COM1 Port

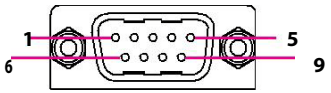
Connector type: DB-9 port, 9-pin D-Sub



RS232		RS485		RS422	
Pin	Definition	Pin	Definition	Pin	Definition
1	SP1_DCD	1	SP1_DATA-	1	SP1_TX-
2	SP1_RXD	2	SP1_DATA+	2	SP1_TX+
3	SP1_TXD	3	NC	3	SP1_RX+
4	SP1_DTR	4	NC	4	SP1_RX-
5	GND	5	GND	5	GND
6	SP1_DSR	6	NC	6	SP1_RTS-
7	SP1_RTS	7	NC	7	SP1_RTS+
8	SP1_CTS	8	NC	8	SP1_CTS+
9	SP1_RI	9	NC	9	SP1_CTS-

COM2 Port

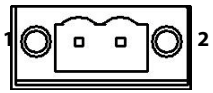
Connector type: DB-9 port, 9-pin



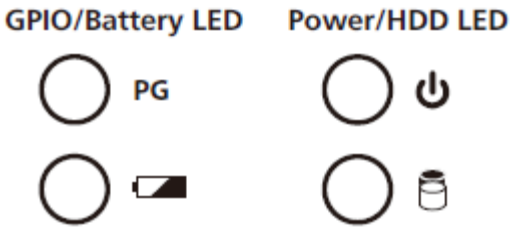
RS232		RS485		RS422	
Pin	Definition	Pin	Definition	Pin	Definition
1	SP1_DCD	1	SP1_DATA-	1	SP1_TX-
2	SP1_RXD	2	SP1_DATA+	2	SP1_TX+
3	SP1_TXD	3	NC	3	SP1_RX+
4	SP1_DTR	4	NC	4	SP1_RX-
5	GND	5	GND	5	GND
6	SP1_DSR	6	NC	6	SP1_RTS-
7	SP1_RTS	7	NC	7	SP1_RTS+
8	SP1_CTS	8	NC	8	SP1_CTS+
9	SP1_RI	9	NC	9	SP1_CTS-

DC Power Input

Connector type: 2-pin



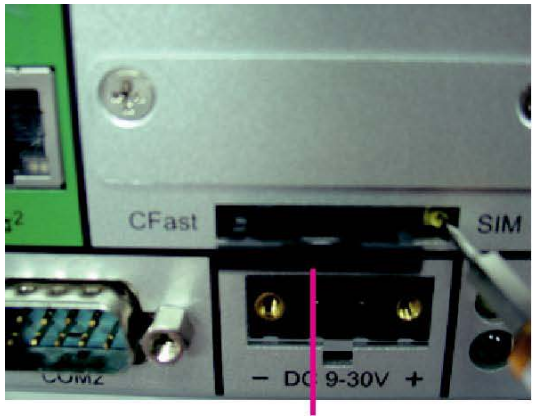
Pin	Definition
1	GND_FLT
2	VIN



Chapter 3: System Setup

Installing a SIM Card

1. Locate the SIM card holder and release the cover.



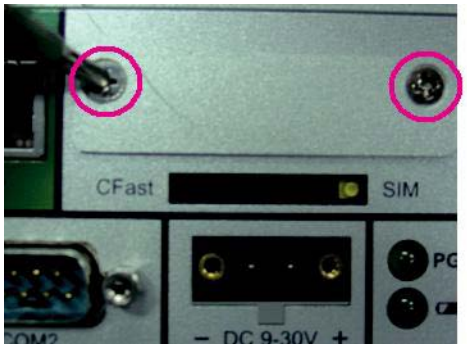
SIM card holder

2. Place the SIM card onto the holder.

3. Close the cover and secure the holder to the original position.

Installing a CFast Card

1. Locate the CFast slot at the front and remove the cover on the slot.



2. Insert the CFast card into the slot and fasten the cover.

Installing a Battery

1. Locate the battery slot at the front and remove the cover on the slot.

2. Insert the battery into the slot and fasten the cover.

Chapter 4: BIOS Setup

This chapter describes how to use the BIOS setup program for the PowerBrick AQ6. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

When to Configure the BIOS

- This program should be executed under the following conditions:
- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering Setup

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

TO ENTER SETUP BEFORE BOOT PRESS

Press the key

to enter Setup:

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the

submenu, move the highlight to that field and press

Legends

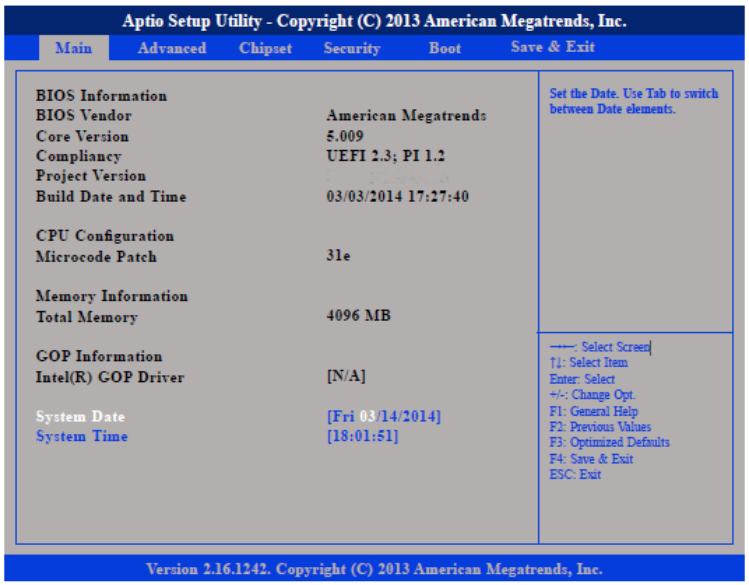
Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub¬menus or fields.
	Exits the BIOS Setup Utility.
	Scrolls forward through the values or options of the highlighted field.
	Scrolls backward through the values or options of the highlighted field.
	Selects a field.
	Displays General Help.
	Load previous values.
	Load optimized default values.
	Saves and exits the Setup program.
	Press <Enter> to enter the highlighted sub-menu

BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press Enter to accept or enter the submenu.

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

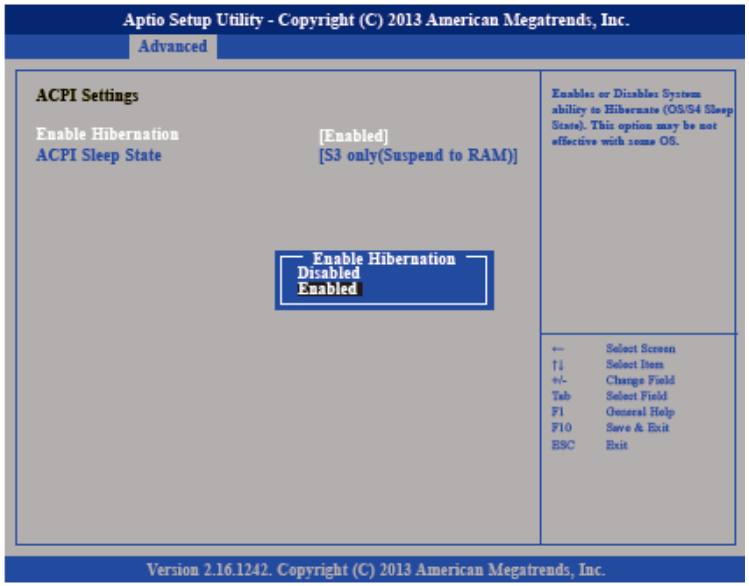
Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Setting incorrect field values may cause the system to malfunction.

ACPI Settings

This section is used to configure ACPI Settings.



Enable Hibernation

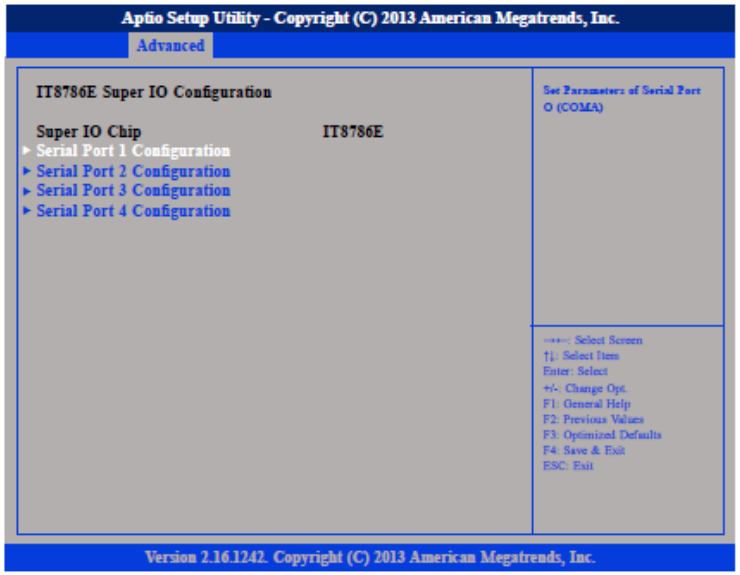
Enables or disables system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. The options are Suspend Disabled and S3 (Suspend to RAM).

IT8786E Super IO Configuration

This section is used to configure the serial ports.



Super IO Chip

Displays the Super I/O chip used on the board.

Serial Port 1 Configuration

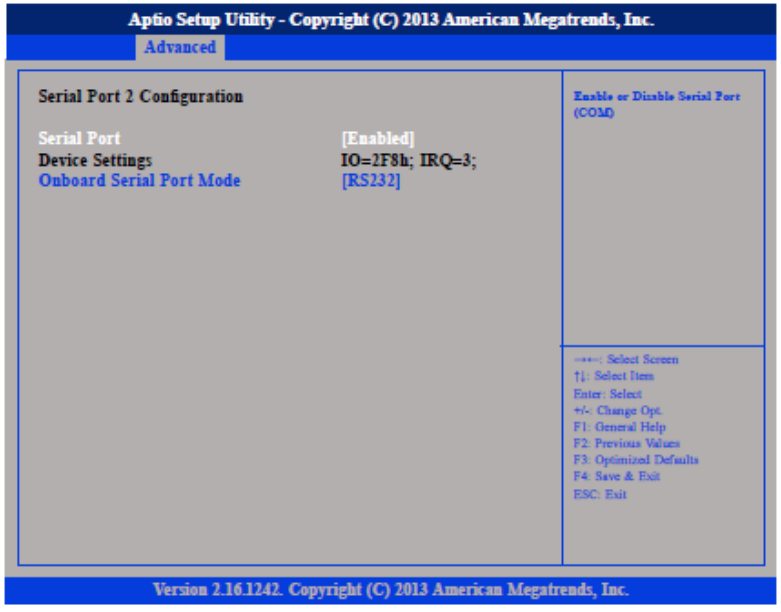
This section is used to configure serial port 1.

Serial Port
Enables or disables the serial port.

Onboard Serial Port Mode
Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Serial Port 2 Configuration

This section is used to configure serial port 2.



Serial Port
Enables or disables the serial port.

Onboard Serial Port Mode
Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Serial Port 3 Configuration

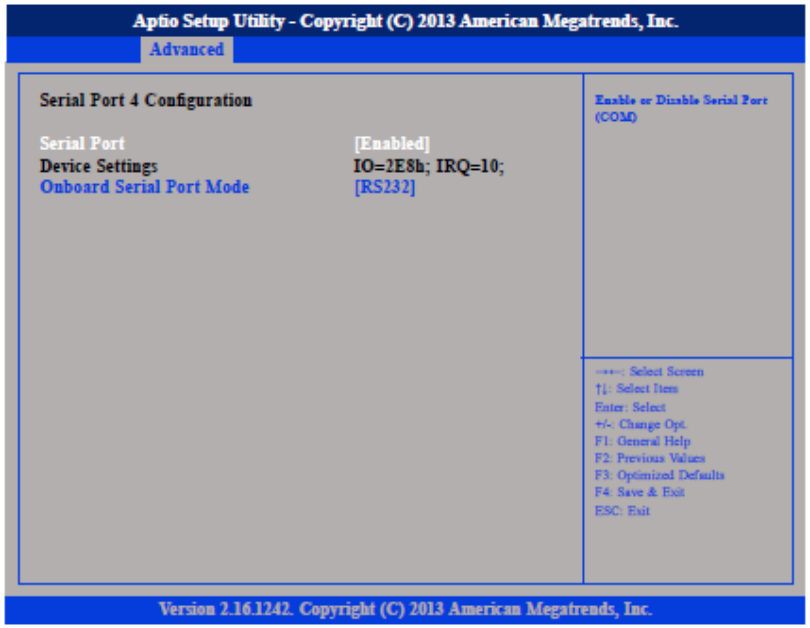
This section is used to configure serial port 3.

Serial Port
Enables or disables the serial port.

Onboard Serial Port Mode
Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

Serial Port 4 Configuration

This section is used to configure serial port 4.

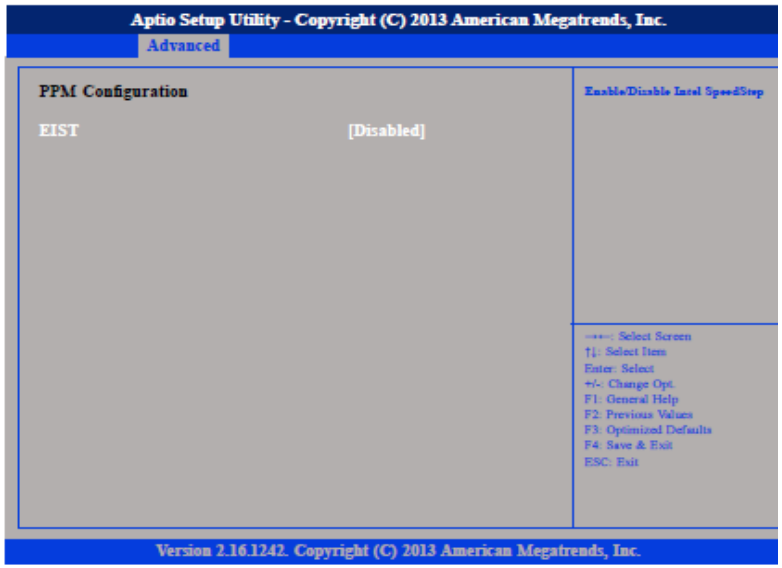


Serial Port
Enables or disables the serial port.

Onboard Serial Port Mode
Select this to change the serial port mode to RS232, RS422, RS485 or RS485 Auto.

PPM Configuration

This section is used to configure the Processor Power Management (PPM) configuration.

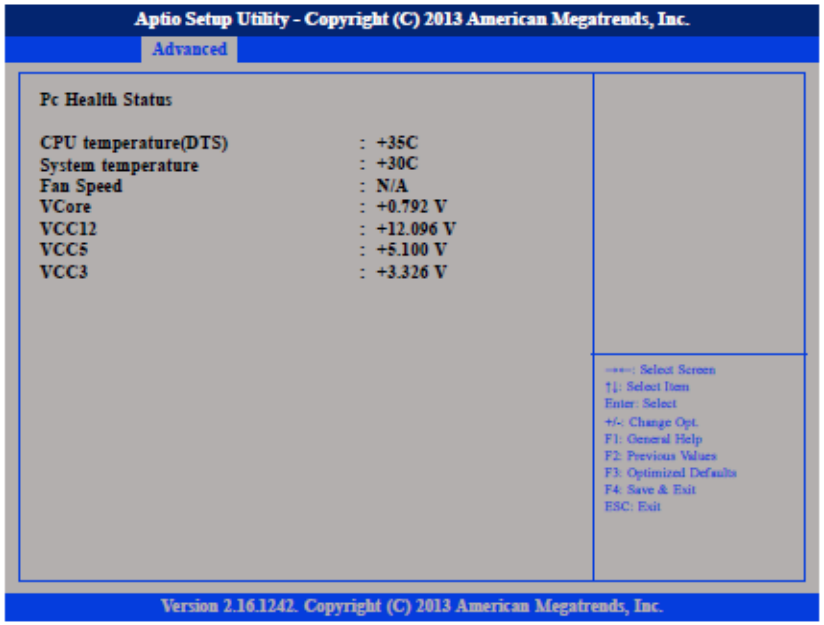


EIST

Enables or disables Intel® SpeedStep.

H/W Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.



CPU Temperature

Detects and displays the current CPU temperature.

System Temperature

Detects and displays the current system temperature.

Fan Speed

Detects and displays the fan speed.

VCore

Detects and displays the Vcore CPU voltage

VCC12

Detects and displays the Vcore CPU voltage.

VCC5

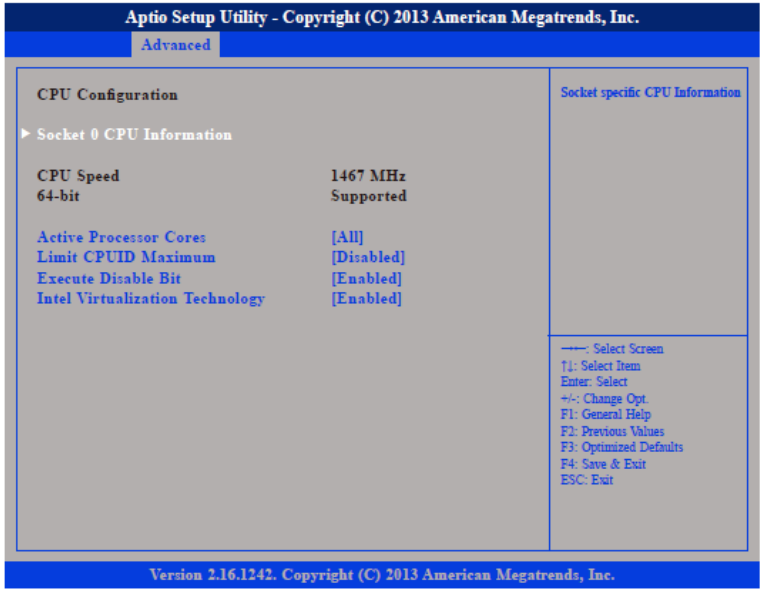
Detects and displays 5V voltage.

VCC3

Detects and displays 3.3V voltage.

CPU Configuration

This section is used to configure the CPU.



Active Processor Cores

Select the number of cores to enable in each processor package.

Limit CPUID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or lesser than 3.

Execute Disable Bit

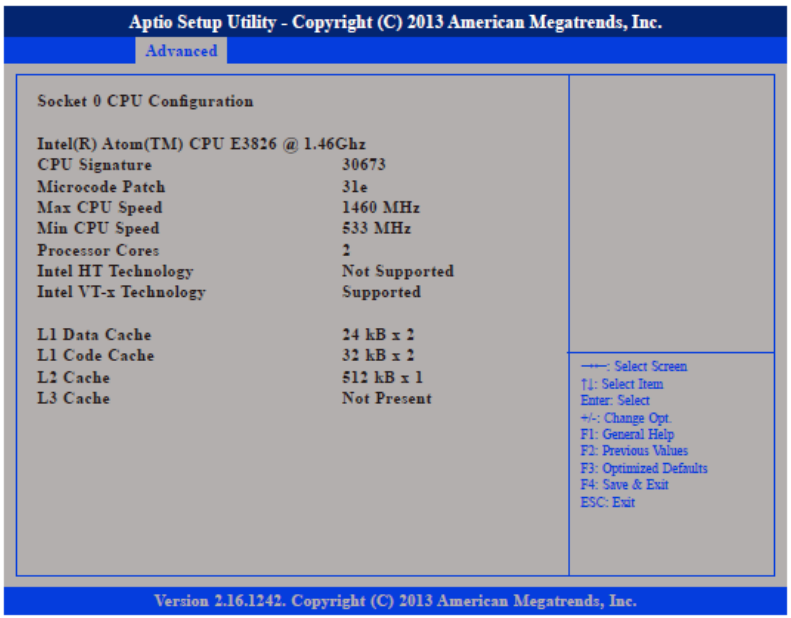
When this field is set to Disabled, it will force the XD feature flag to always return to 0. XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3).

Intel® Virtualization Technology

Enables or disables Intel® Virtualization technology.

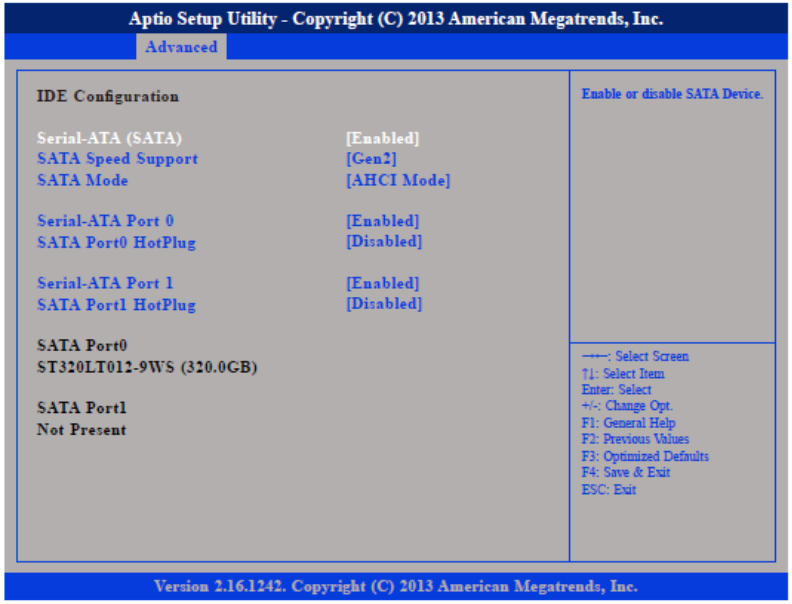
Socket 0 CPU Information

This section displays the information of the CPU installed in Socket 0.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
Socket 0 CPU Configuration
Intel(R) Atom(TM) CPU E3826 @ 1.46Ghz
CPU Signature 30673
Microcode Patch 31e
Max CPU Speed 1460 MHz
Min CPU Speed 533 MHz
Processor Cores 2
Intel HT Technology Not Supported
Intel VT-x Technology Supported
L1 Data Cache 24 kB x 2
L1 Code Cache 32 kB x 2
L2 Cache 512 kB x 1
L3 Cache Not Present
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

IDE Configuration

This section is used to configure the SATA drives.



Enables or disables hotplug support on SATA port 1 and SATA port 2.

SATA Port1 Hotplug and SATA Port2 Hotplug

Serial-ATA (SATA)

Enables or disables SATA device.

SATA Speed Support

Configures the SATA controller to Gen1 or Gen2 speed.

SATA Mode

Configures the SATA as IDE, AHCI or RAID mode.

SATA Mode

Configures the SATA as IDE, AHCI or RAID mode.

IDE This option configures the Serial ATA drives as Parallel ATA physical storage device.

AHCI This option configures the Serial ATA drives to use AHCI (Advanced Host Controller Interface). AHCI allows the storage driver to enable the advanced Serial ATA features which will increase storage performance.

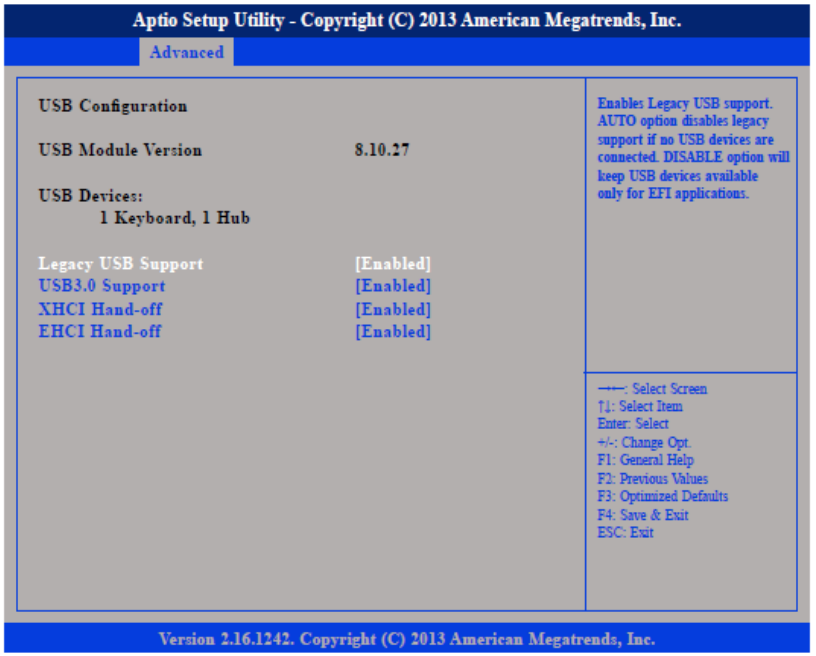
Serial-ATA Port 0 and Serial-ATA Port 1

Enables or disables SATA port 0 and SATA port 1.

Enables or disables hotplug support on SATA port 1 and SATA port 2.

USB Configuration

This section is used to configure the USB.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Advanced
USB Configuration
USB Module Version 8.10.27
USB Devices:
1 Keyboard, 1 Hub
Legacy USB Support [Enabled]
USB3.0 Support [Enabled]
XHCI Hand-off [Enabled]
EHCI Hand-off [Enabled]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Legacy USB Support

Enable Enables Legacy USB.

Auto Disables support for Legacy when no USB devices are connected.

Disable Keeps USB devices available only for EFI applications.

USB3.0 Support

Enables or disables USB 3.0 controller support.

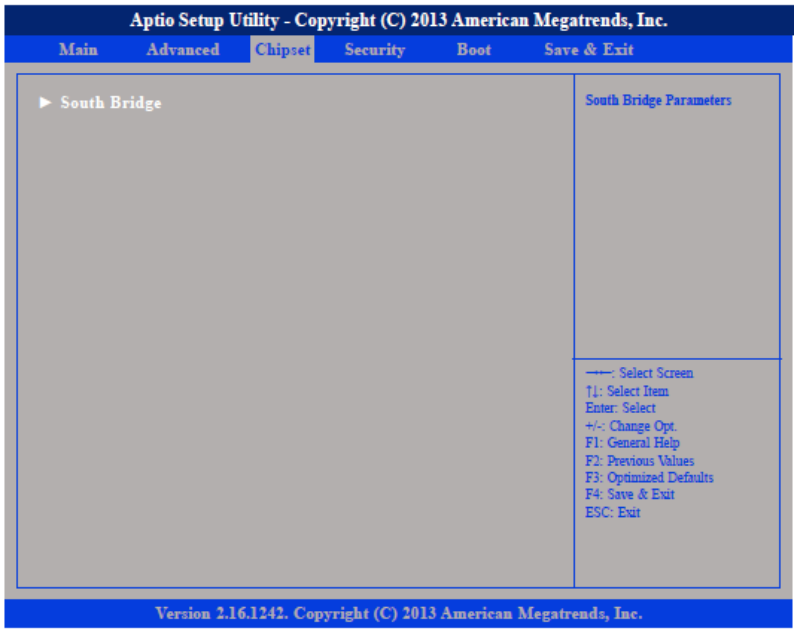
XHCI Hand-off and EHCI Hand-off

This is a workaround for OSs that does not support XHCI hand-off and EHCI

Hand-off. The XHCI and EHCI ownership change should be claimed by the XHCI and EHCI driver respectively.

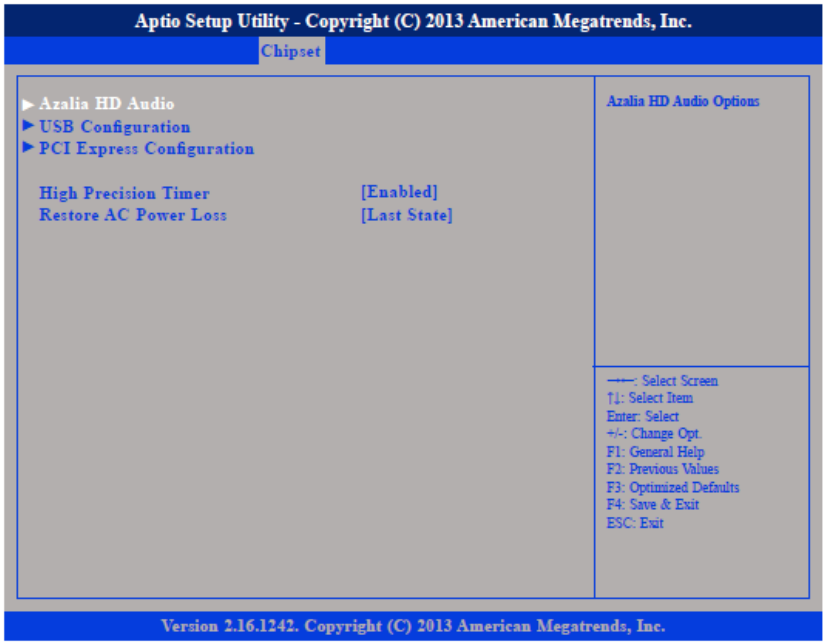
Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.



South Bridge

This section is used to configure the south bridge features.



High Precision Timer

Enables or disables the high precision event timer.

Restore AC Power Loss

Power Off When power returns after an AC power failure, the system's power is off. You must press the power button to power-on the system.
Power On When power returns after an AC power failure, the system will automatically power-on.
Last State When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

PCH Azalia Configuration

Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Chipset
Audio Configuration
Audio Controller [Enabled]
Azalia HDMI Codec [Enabled]
Control Detection of the Azalia device.
Disabled = Azalia will be unconditionally disabled
Enabled = Azalia will be unconditionally Enabled
Auto = Azalia will be enabled if present, disabled otherwise.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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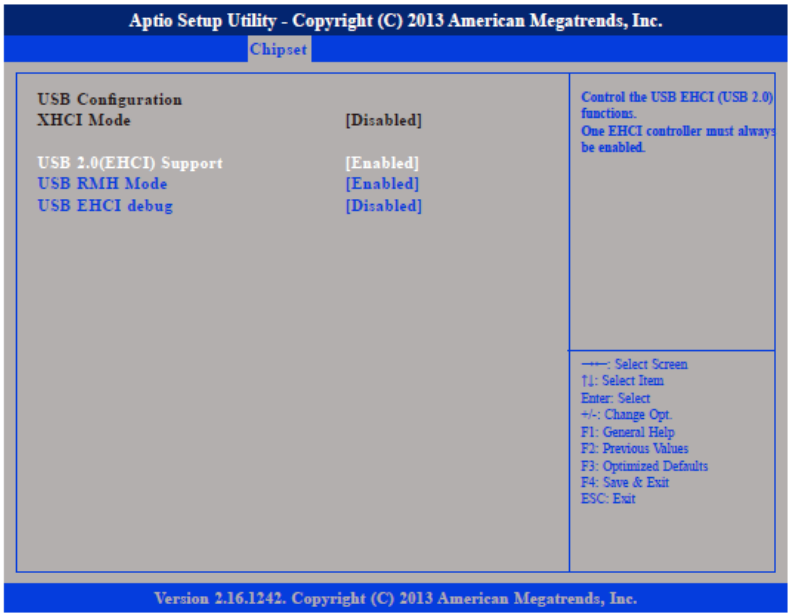
Azalia
Control detection of the Azalia device.
Disabled Azalia will be unconditionally disabled.
Enabled Azalia will be unconditionally Enabled.

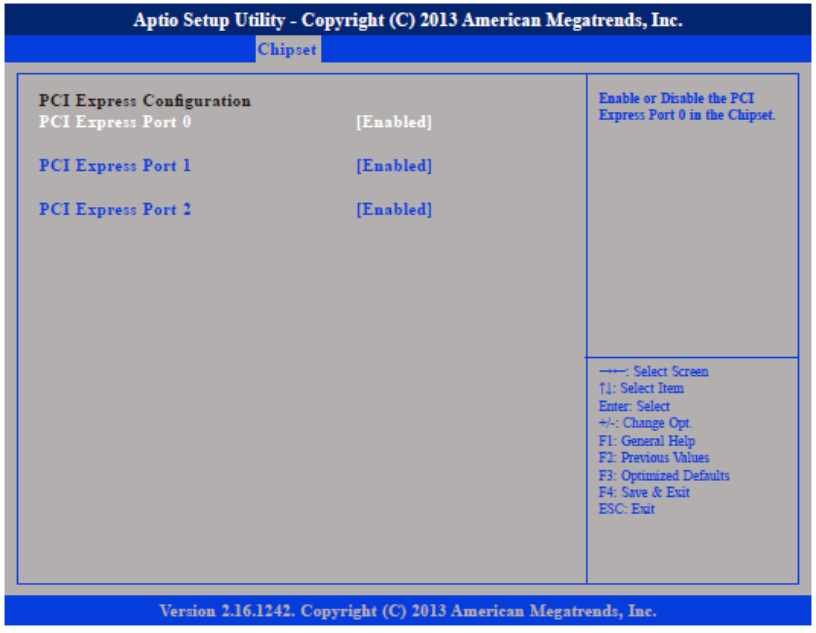
Azalia HDMI Codec
Enables or disables internal HDMI codec for Azalia.

USB Configuration


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Chipset
USB Configuration
XHCI Mode [Disabled]
USB 2.0(EHCI) Support [Enabled]
USB RMH Mode [Enabled]
USB EHCI debug [Disabled]
Control the USB EHCI (USB 2.0) functions.
One EHCI controller must always be enabled.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2013 American Megatrends, Inc.

USB 2.0(EHCI) Support
Enables or disables the Enhanced Host Controller Interface (USB 2.0), one
EHCI controller must always be enabled.
USB RMH Mode
Enables or disables PCH USB rate matching hubs mode.
USB EHCI Debug
Enables or disables PCH EHCI debug capability.

PCI Express Configuration


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Chipset
PCI Express Configuration
PCI Express Port 0 [Enabled]
PCI Express Port 1 [Enabled]
PCI Express Port 2 [Enabled]
Enable or Disable the PCI Express Port 0 in the Chipset.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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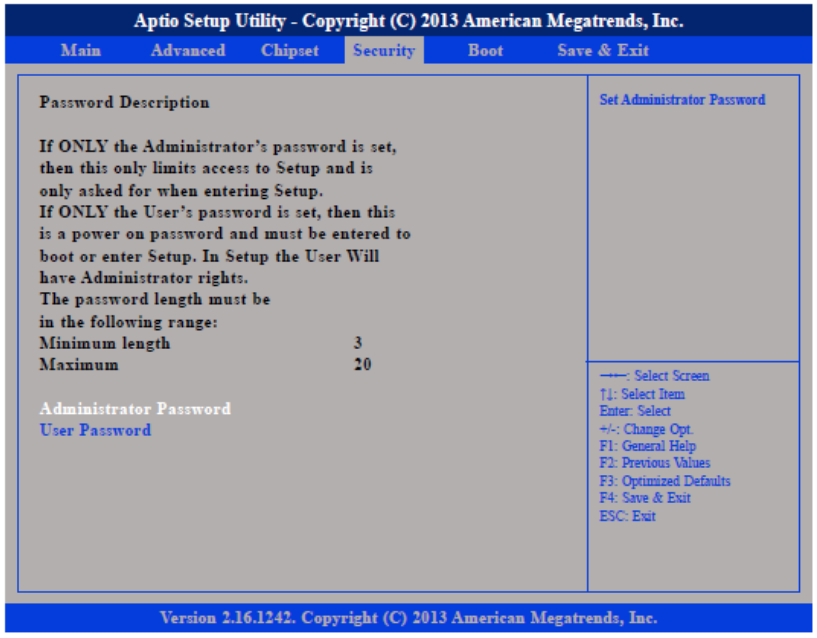
PCI Express Port 0 to PCI Express Port 2
Enables or disables the PCI Express ports 0 to 2 on the chipset.

Security

Administrator Password
Select this to reconfigure the administrator's password.

User Password
Select this to reconfigure the user's password.


Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main Advanced Chipset Security Boot Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User Will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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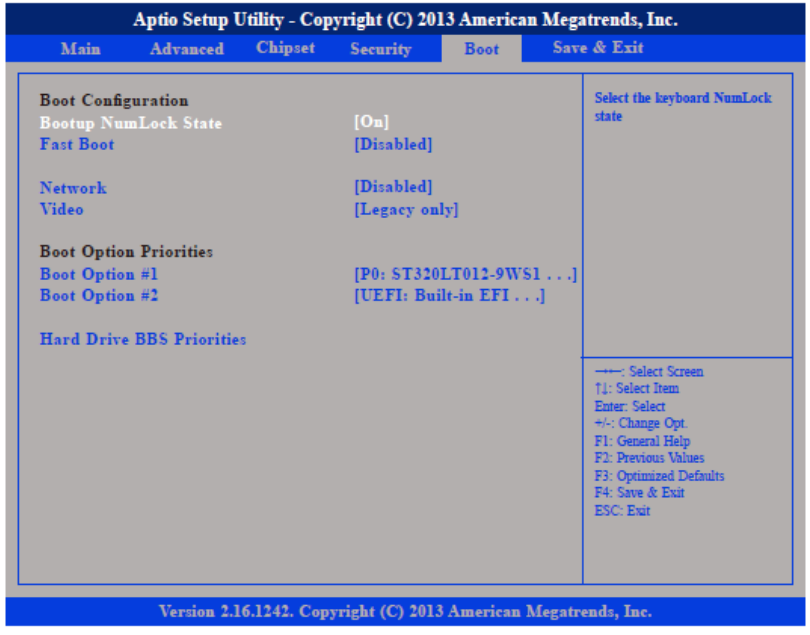
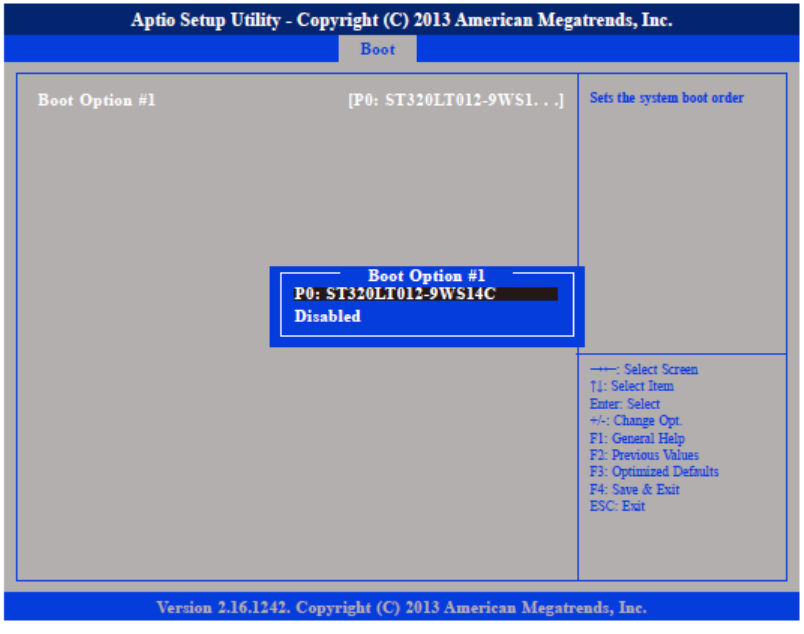
Boot

This section is used to configure the boot features.

Bootup NumLock State
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the
numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Fast Boot
When enabled, the BIOS will shorten or skip some check items during POST.
This will decrease the time needed to boot the system.





Network
Controls the execution of UEFI and legacy PXE OpROM.
Video
Controls the execution of UEFI and legacy video OpROM.
Boot Option Priorities
Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.
Hard Drive BBS Priorities
Boot Option #1

Sets the system boot order.

Save & Exit

Save Changes and Reset
To save the changes and reset, select this field then press <Enter>. A dialog
box will appear. Confirm by selecting Yes.
Discard Changes and Reset
To exit the Setup utility without saving the changes, select this field then
press <Enter>. You may be prompted to confirm again before exiting.
Restore Defaults
To restore the BIOS to default settings, select this field then press <Enter>. A
dialog box will appear. Confirm by selecting Yes.

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Technical Support:

For **technical support contact your Salesperson**

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